Space Weather Forecast

Issued on Monday, 06 February 2023 at 13:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of Minor Geomagnetic Storm intervals days 1 and 2 (6th and 7th). Probable increase in X-ray flare activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with X-ray activity generally subdued and no significant flares observed.

There are now nine sunspot regions on the visible disc, with two new regions developing in the northeast quadrant during the period and two regions appearing round the northeast horizon. All regions remain relatively small or magnetically simple, although some small growth occurred with a sunspot region in the southwest.

Up to three 'prominence eruptions' (arcs of plasma leaving the Sun as Coronal Mass Ejections (CMEs)) were observed in the period, two from the southeast horizon and one from the southwest horizon. None of these events are likely to effect Earth, and thus no Earth-directed CMEs were observed during the period.

Solar Wind / Geomagnetic Activity: The observed solar wind parameters indicated the onset of a negative polarity coronal hole fast wind. The solar wind speed was slow but increased to slightly elevated levels by 06/0220 UTC, with a peak of 450 km/s by the end of the period. The total magnetic field strength was moderate 05/1800-06/1000 UTC, otherwise it was weak, with moderate transitions of the north-south component, although these were not sustained. Geomagnetic activity was Quiet (Kp 1-2) but became Unsettled (Kp 3) from 06/0000 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low solar activity is likely during the forecast period , however there are signs that the arriving eastern solar horizon contains more potent active regions (from CME evidence, prominences (arcs of plasma) and satellite imagery), with a probable increase in activity therefore considered through the coming UTC working week, and thus an increasing chance of Moderate-class flares.

Solar Wind / Geomagnetic Activity: No definitively Earth-directed CMEs feature in the forecast at present, although given the sheer number of peripheral CMEs over the UTC weekend, confidence in this assertion is relatively low, especially from day 3 (8th). Non-impactful glancing transient activity is considered a possibility from midweek.

The current enhanced solar wind environment is expected to continue until day 3 (8th), when negative coronal hole effects wane. Unsettled to Active geomagnetic conditions, with a slight chance of Minor Storm intervals, should reduce to predominantly Quiet levels from midweek UTC.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	15	20	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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